

Simulation Based Acquisition Revisited

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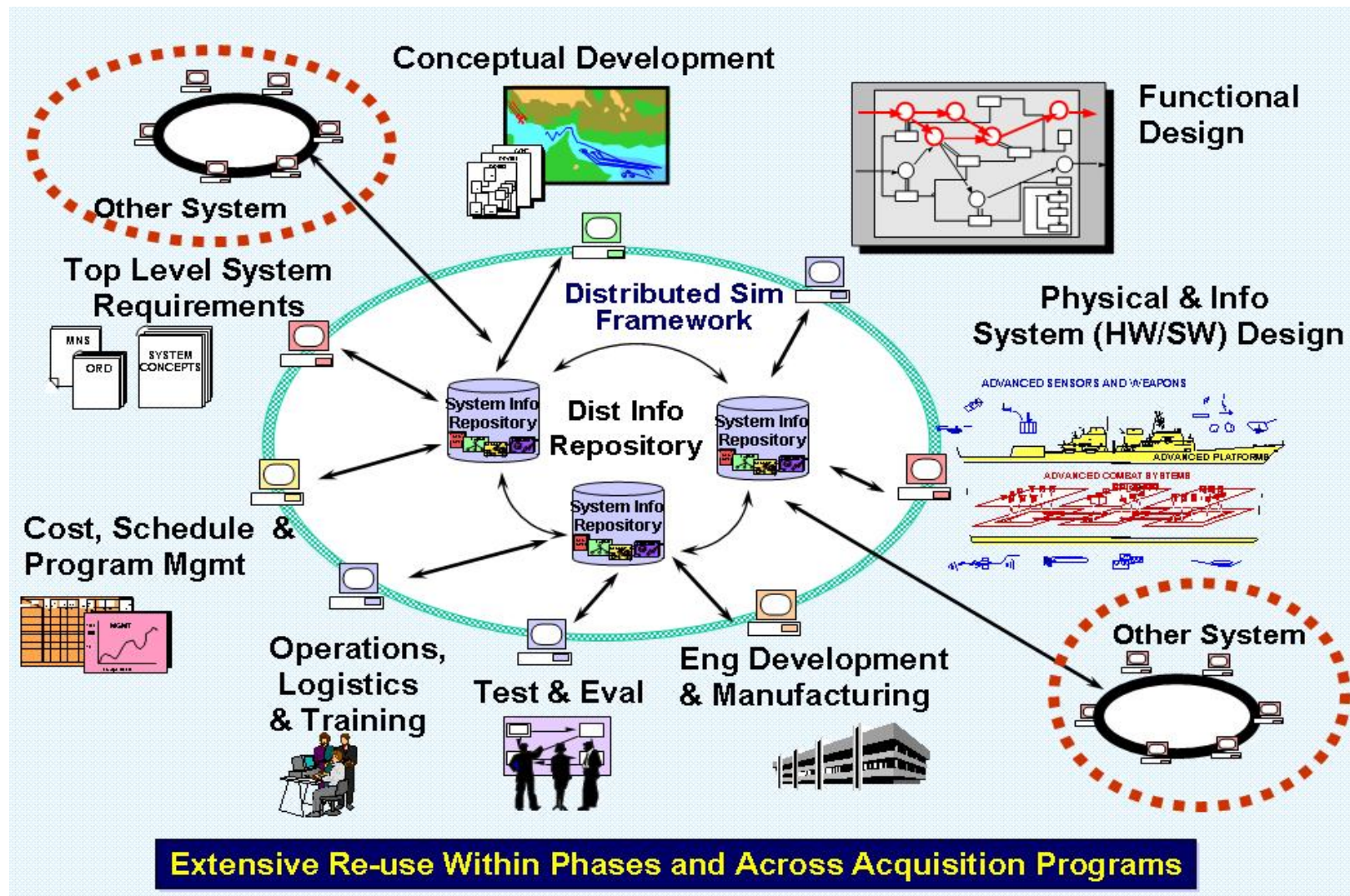
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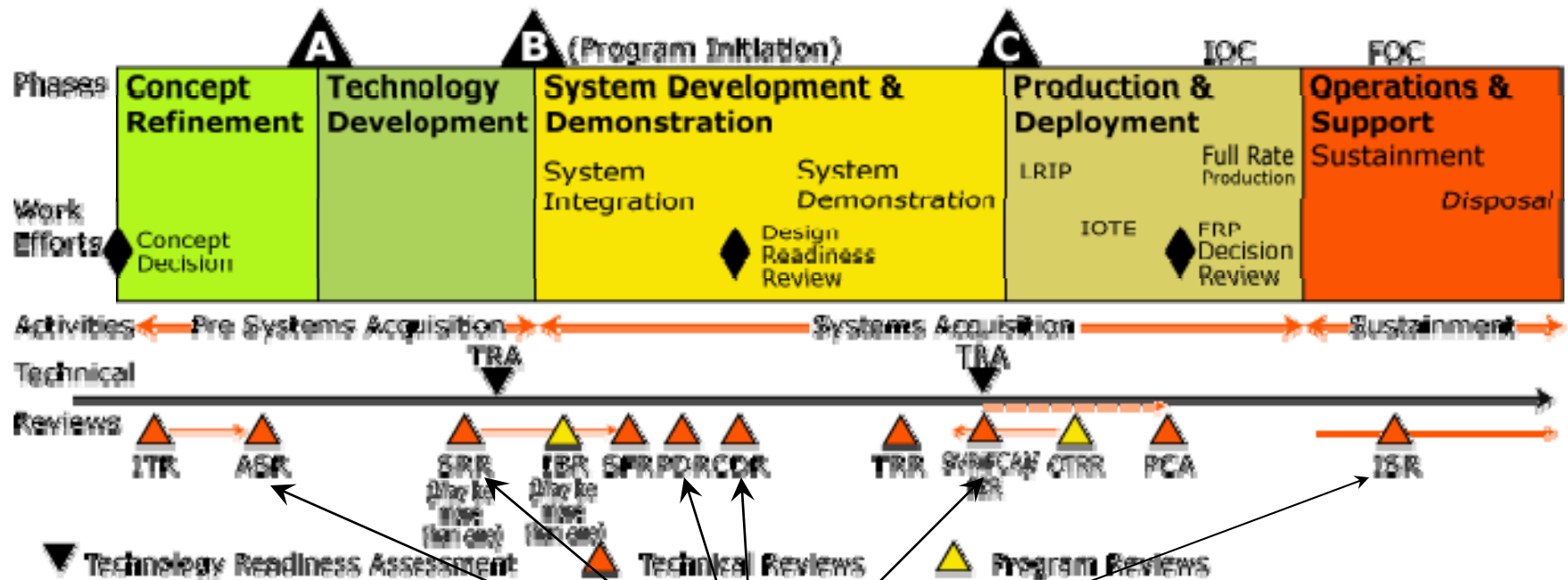
Simulation Based Acquisition

A 1990s vision not yet realized ...



Acquisition Process

Still calls for M&S throughout the phases



Key decision points that should be informed by M&S



Barriers to Implementation

Business

- M&S Business Case for an Individual Acquisition Program
- Model and Data Ownership Rights
- M&S Maintenance

Technical

- Validation, Verification, Accreditation (VV&A)
- Interoperability and Reuse -- Infrastructure/Standards
- M&S in a Service Oriented Architecture (e.g. GIG)

Cultural

- Lack of understanding of M&S capabilities and limitations



Phillip E. Coyle *(former DOT&E)*

- I came to the Pentagon from the Lawrence Livermore National Laboratory ... We never did a test without first trying to calculate - model, as you would say - in rather excruciating detail what would happen. It was literally unthinkable that you would spend millions of dollars on a test without making an equivalent effort first in M&S.
- For the most part, the DOD does not do that. It's quite common in the DOD to spend millions of dollars on a test without making any significant investment in M&S first. *(7 Mar 06 NDIA 22nd National T&E Conference)*

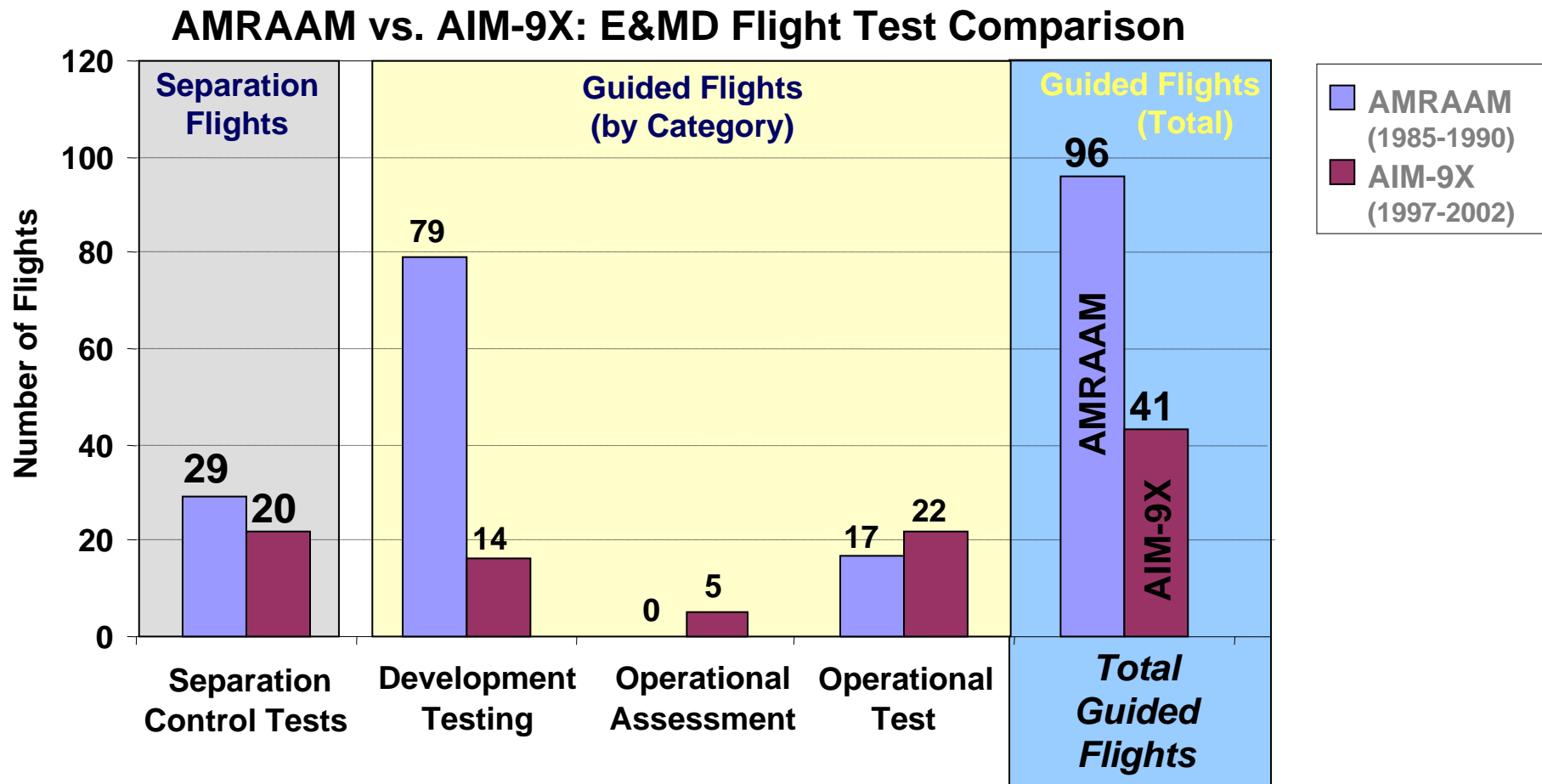


So Where Does Simulation Based Acquisition Make Sense?

- When the investment pays for itself in one program
 - *Example: AIM-9X*
- When reuse enables multiple programs to benefit
 - *Example: Ship Anti-Air Warfare M&S*
- When M&S is more informative than physical test
 - *Example: Full ship shock trials*
- When there is no other practical way to verify effectiveness and suitability
 - *Example: Distributed System of Systems, net-ready KPP*

Raytheon Used M&S Successfully on AIM-9X

*Simulation Based Acquisition (SBA) Led To
Dramatic Reductions In Weapon System Testing*





Full Ship Shock Trials

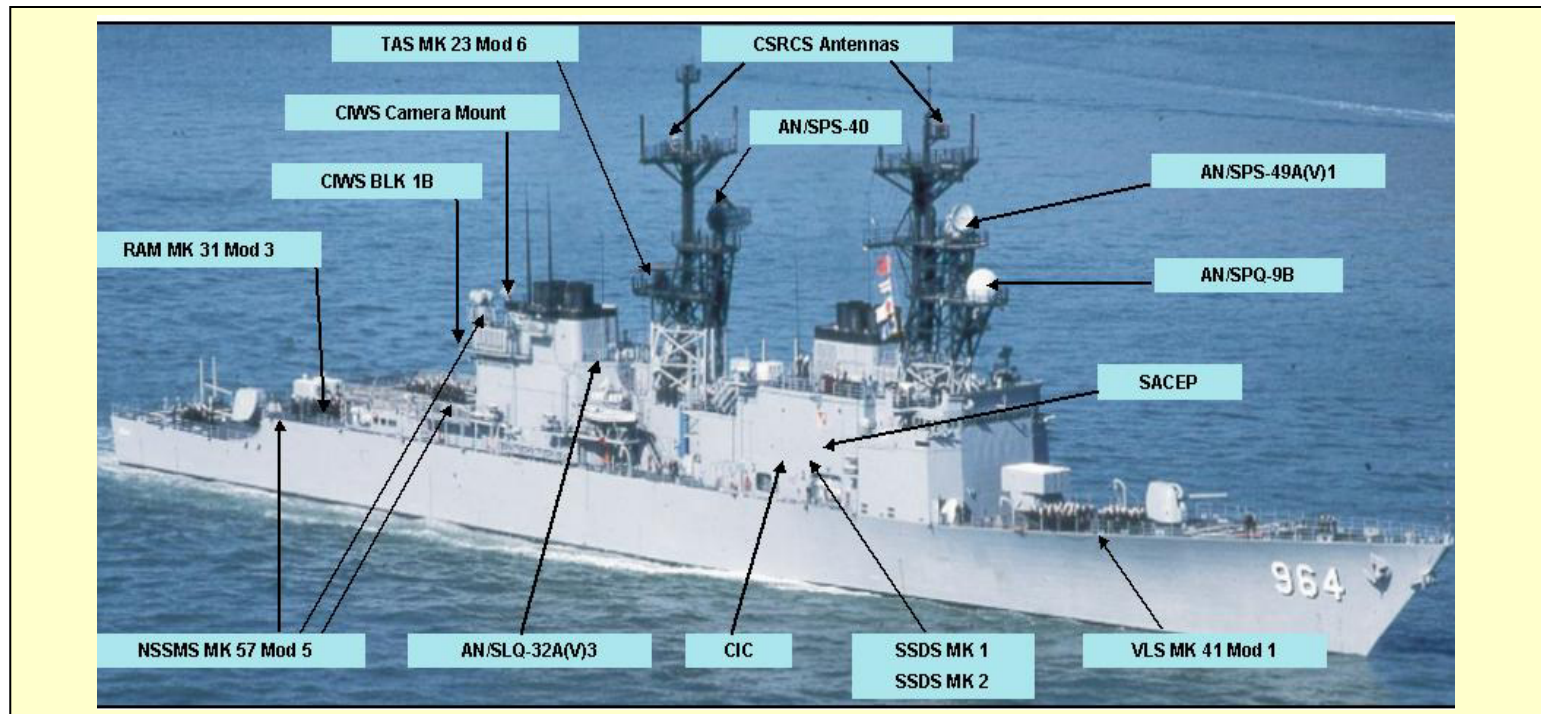
Need more knowledge at less cost



The Navy is going broke doing the right thing using traditional methods.

Ship Self Defense AAW

PEO(IWS)

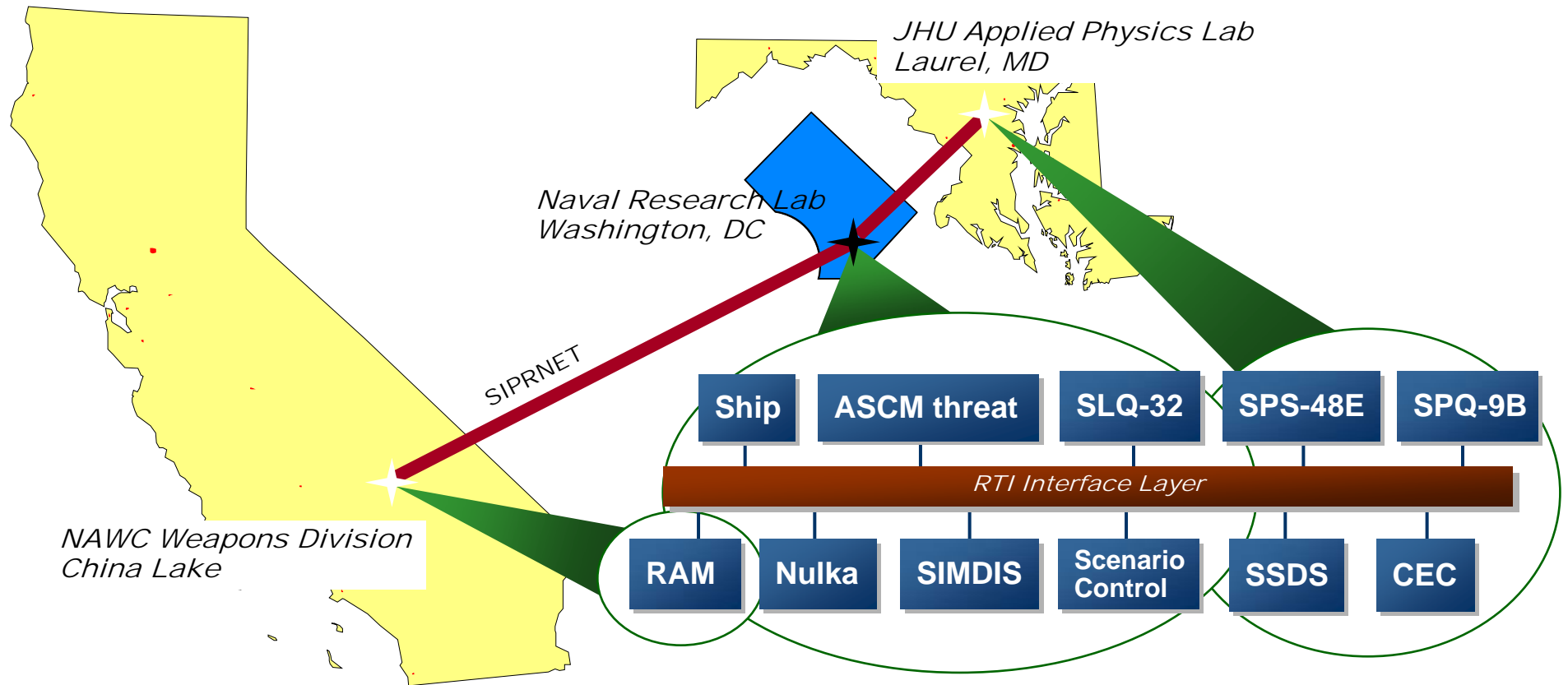


- High degree of commonality in combat systems
 - LPD 17, LHA6, LCS, DDG 1000, CVN 21
- All must demonstrate Probability of Raid Annihilation (P_{RA})
- Opportunity for savings through common T&E and simulation



Navy Enterprise Testbed for P_{RA}

Virtual Test Ship, Virtual Range





Interoperability and Reuse

Key to a viable business case across programs

DoD and Navy Programs:

- Processes and Methodology
 - *JTEM*
- Infrastructure
 - *JMETC*
 - *Navy ACETEF, IBAR, DEP, PRA Testbed, ...*
- Standards
 - *DIS, TENA, HLA, XML, SEDRIS, ...*
- Lead Programs
 - *Navy CVN-21, MMA, JSF*

Evolution in Interoperability and Reuse

Moving toward "Train like we fight ... Test like we fight"

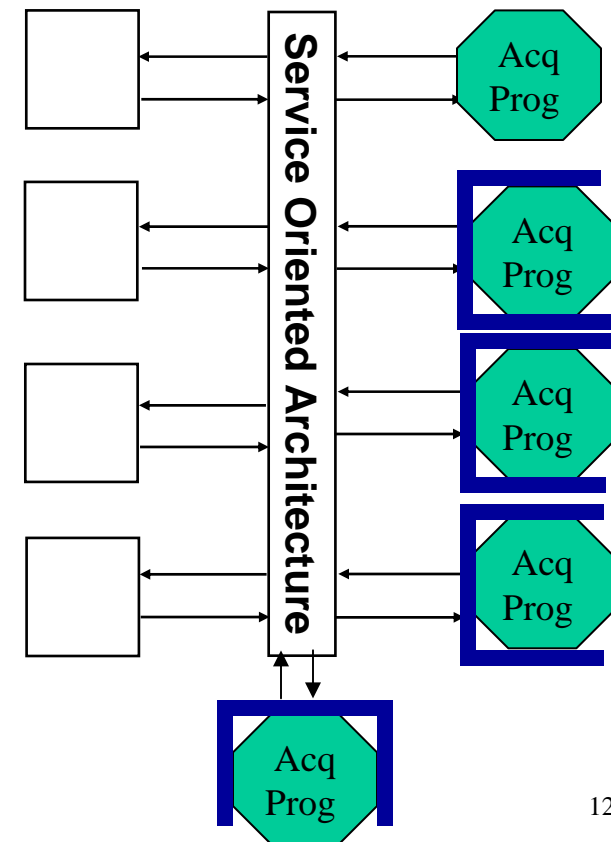
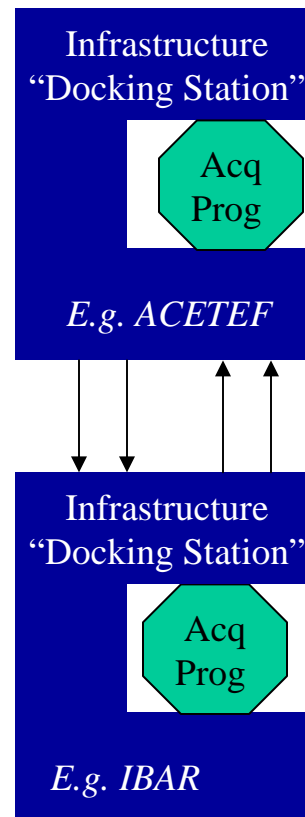
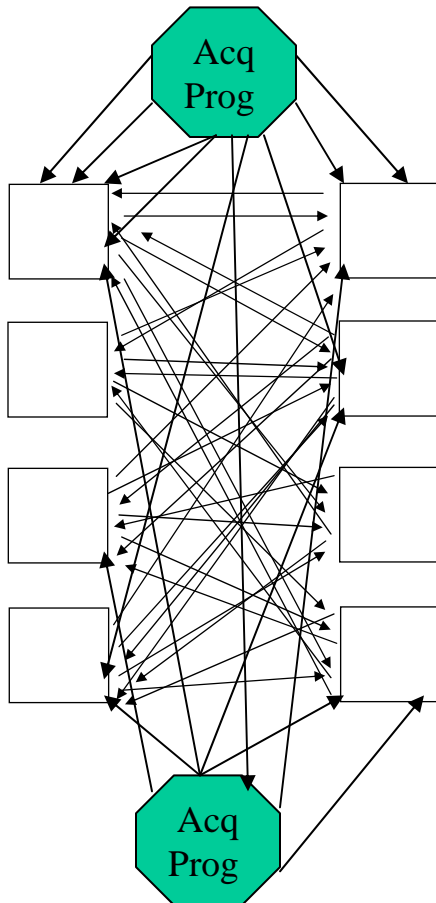
Level A
Ad Hoc



Level B
Portals

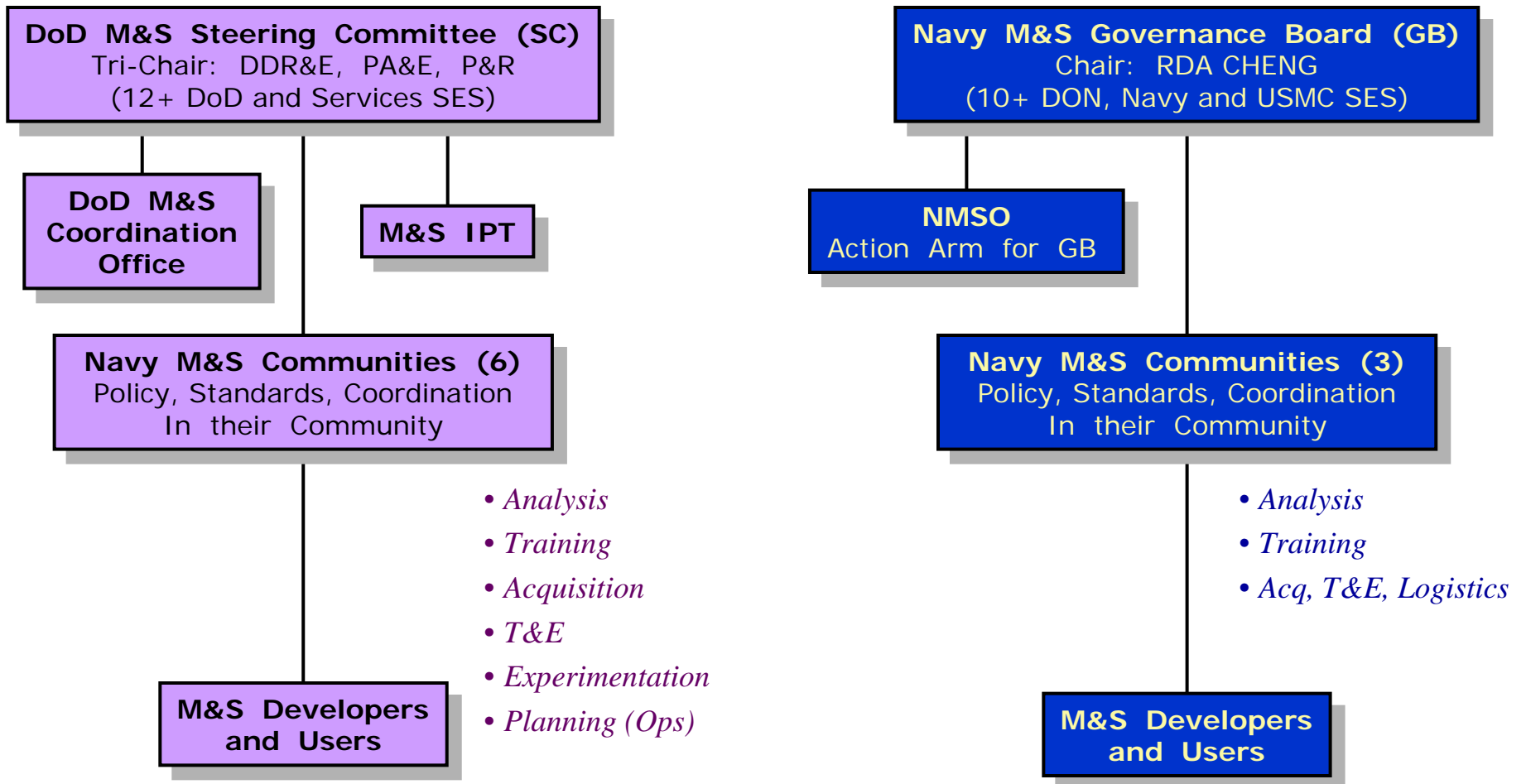


Level C
*Service Oriented
Architecture?*





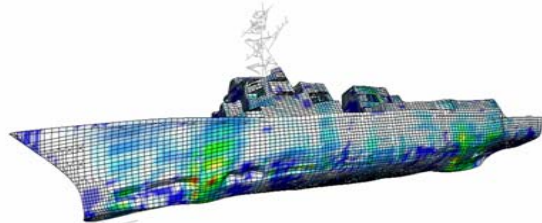
DoD & Navy M&S Governance





Challenges for Acquisition Research

- Making the business case for M&S
- Increasing the government role in Systems Engineering, with M&S providing insight at key decision points
- Contract deliverables and intellectual property rights in M&S
- Understanding commonalities and differences across domains
 - Analysis, Training, Systems Engineering, T&E, Logistics
- Model Driven Architecture (MDA) for software acquisition
 - Leveraging unambiguous, executable functional specs



Questions?